

REMARKS

By this amendment, claims 1-5, 9, and 11-13 are canceled, claim 6 is revised, and new claims 14-16 are added to place this application in condition for allowance. Currently, claims 6 and 14-16 are before the Examiner for consideration on their merits.

More specifically, claim 6 has been revised to be in independent form, and incorporate the limitations of claim 1. Claims 14-16 are similar to canceled claims 3-5 in further defining the steel pipe composition, with claim 14 defining a basic composition, claim 15 defining the basic composition with the addition of one or more of Cr, Mo, and V, and claim 16 defining the basic composition with one or both of Ti and Nb.

In the prior art rejection, the Examiner had taken the position that the pipe is known and therefore has rejected the product claims based on this reasoning. This rejection is moot in light of the cancellation of the product claims.

Thus, the remaining issue with whether the method of claim 6, as revised, is either known or rendered obvious by the prior art. In the rejection, the Examiner contends that the specification admits that the claimed process is known, referring to Figures 2 and 3 of the specification, and rejects the claims under 35 U.S.C. § 102(b).

Applicants dispute the anticipation rejection. The allegation that the invention as defined in claim 6, either originally or as amended, has been admitted in the specification is without merit. Claim 6 defines a particular method of expanding a particular steel pipe, one that uses a pipe that abides by the expression (1) formula, i.e., has a particular non-uniform wall thickness ratio E_0 . At most, Figures 2 and 3 show a general method of expanding a steel pipe, but nowhere is there an admission that the method employs a steel pipe that meets the formula (1) of claim 1. The very

essence of the invention is the discovery of the importance of practicing the embedding process using a steel pipe abiding by the formula, and to say that this is admitted as prior art in the specification makes no sense. Therefore, the Examiner cannot rely on the specification to allege that the method of claim 6 is taught or suggested.

Therefore and in order to continue to reject claim 6, the Examiner must provide a reason why one of skill in the art would practice the expanding steps of claim 6 on a pipe that abides by the claimed formula. It is respectfully submitted that there is no reason to arrive at such a conclusion without resort to the hindsight reconstruction of the prior art in light of Applicants' disclosure.

Moreover, the Examiner cannot contend that Applicants are merely optimizing a routine parameter, since in order for this position to make sense, the parameter must be considered routine. Nowhere does the prior art even hint at the use of the claimed formula as a guide for embedding and expanding processes. Consequently, the Examiner has no basis to even allege that the claimed process is merely the optimization of that which is already known.

Even if the Examiner were to allege that it would be obvious to optimize the pipe size or characteristics when practicing an embedding process, such an allegation would be effectively rebutted by the evidence set forth in the specification. That is, the specification shows that when pipes that meet the claimed formula are expanded, improvements are realized. Moreover, these improvements are unexpected since they are not recognized by the prior art, and, in fact, serve as the very basis of the

invention, i.e., solving the problem of pipes collapsing and/or bending during embedding and expanding processes.

As previously argued, the end result of satisfying the expression 1 of $E_0 \leq 30 / (1 + 0.018\alpha)$ is an avoidance of the lowering of the collapse strength of the expanded pipe. The inventors realized that the prior art method of embedding and expanding as described on pages 2 and 3 of the instant specification caused a lowering of the collapse strength and bending of the pipe. This is caused by the wall thickness of the pipe not being uniform in cross section, and because of this, the different thicknesses of the pipe react differently during the expanding process. The thinner sections, when expanded, are subjected to a different working ratio and therefore collapse strength suffers. Also, the different thicknesses result in different expansions, and subsequently different amounts of shrinkage occur in the longitudinal direction of the pipe. The varying shrinkage can cause bends in the pipe.

By abiding by the expression 1 of claim 6, the lowering of the collapse strength is avoided. The Examiner's attention is drawn to Table 2 and Figure 6. Table 2 shows the four tested alloys and various scenarios for each alloy. For example, alloy A uses three different values for α , and this results in three different values for the expression $30 / (1 + 0.018\alpha)$. Comparing E_0 to the expression reveals that when E_0 is less than the expression, excellent collapse strength is realized, measured in terms of the ratio C_1/C_0 . As one example, the steel A with an expanding ratio of 10 shows a C_1/C_0 ratio of 0.98 when its E_0 is 5.4, which is smaller than the value defined by the expression $30 / (1 + 0.018\alpha)$. In contrast, the C_1/C_0 is 0.76 when the E_0 exceed the $30 / (1 +$

0.018 α) value. In general, in tests where E0 was greater than the expression $30 / (1 + 0.018\alpha)$, collapse strength ratio was consistently less than 0.8 and unacceptable. In contrast, a pipe having a non-uniform wall thickness that meets the formula of claim 6 produces a ratio more than 0.8 and performs better.

The improvements in collapse strength by abiding by the expression (1) of claim 6 in light of expressions 2 and 3 of claim 6 are totally unexpected in the art. Therefore, any subsequent rejection would not only have to teach the claimed method but also, in essence, teach the invention in terms of the discovery of the importance of controlling the pipe dimension according to the claimed formula. Without such prior art, the Examiner has no choice but to withdraw the rejection of claims 6 and 14-16 under 35 U.S.C. § 102(b).

The remaining issue raised in the Office Action is under 35 U.S.C. § 112, second paragraph. Here, the Examiner contends that the claims are indefinite since it is not clear as to how the inner diameter of a non-uniform wall thickness pipe is determined. Also, the Examiner refers to Figure 8b as an example of how it would be difficult to measure the inner diameter without more explanation.

It is respectfully submitted that the use of "inner diameter" when dealing with pipes of non-uniform wall thicknesses is not on its face unclear or vague to one of ordinary skill in the art. As the Examiner known, definiteness is measured from the standpoint of the written specification and the level of skill in the art. In this regard, it is well recognized in the art that when measuring the inner diameter of a pipe that may have a non-uniform wall thickness, the inner diameter of the pipe is the average of

values of inner diameters measured in two directions that are at right angles to each other. One of skill in the art knowing this would not consider the description of the formula of claim 6 unclear when considering the inner diameter of the pipe in the "before" and "after" expanded states. Therefore, it is contended that the language of claim 6 as it relates to an inner diameter of the pipe is not vague or indefinite under 35 U.S.C. § 112, second paragraph, and the rejection must be withdrawn.

It should also be noted that the drawings of the differently shaped pipes in Figure 8 are exaggerated drawings. In fact, the third to sixth orders of the non-uniform wall thickness are usually very small in the actual pipe. Since the variation in thickness is actually small, one can use the known measurement technique described above to provide an accurate assessment of the inner diameter of the pipe. Therefore, the renditions of the third to sixth orders in Figure 8 do not provide a basis to support an allegation that the inner diameter of such a pipe could not be determined or that some unique and not-well known process must be disclosed in the specification in order to make claim 6 definite under 35 U.S.C. § 112, second paragraph. In light of these arguments, it is contended that the rejection of claim 6 based on indefiniteness must be withdrawn. If the Examiner persists in maintaining the rejection based on the alleged vagueness of defining the inner diameter of a non-uniform pipe, the Examiner is requested to provide objective evidence disputing Applicants' contention that the way that the inner diameter pipe is measured is not well known in the art.

Claims 14-16 are also in condition for allowance by reason of their dependency on allowable claim 6.

In summary, since the rejection based on Applicants' specification has been overcome, and the claims are fully definite under 35 U.S.C. § 112, second paragraph, the Examiner has no choice but to allow the pending claims, or find new prior art to reject the claims.

Accordingly, the Examiner is respectfully requested to examine this application in light of this amendment and pass all pending claims onto issuance.

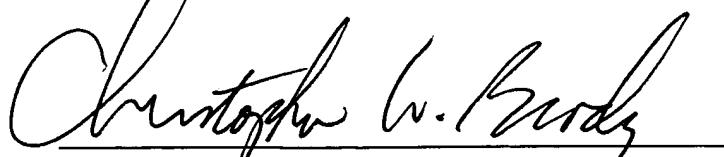
If the Examiner believes that another interview with Applicants' attorney would be helpful in expediting prosecution of this application, the Examiner is requested to telephone the undersigned at 202-835-1753.

The above constitutes a complete response to all issues raised in the Office Action dated March 10, 2006.

Again, reconsideration and allowance of this application is respectfully requested.

Please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,
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